

**MORLEY RESEARCH CENTRE****Comparison of rye varieties on light land, 1996***D H B Dring and D B Stevens***Summary**

Ten varieties of rye were grown on a light land site. Marder had the highest level of brown rust (*Puccinia recondita*) infection. Yields ranged from 5.32 t/ha (Sentinel) to 5.96 t/ha (Esperit and Merkator) but differences were not statistically significant. Grain size was generally small although grain fill was good. Amando had the lowest thousand grain weight; all varieties had reasonable specific weights.

**Object**

To evaluate the relative performance rye varieties grown under "best local practice" on a light soil.

**Method**

Four replicates of the ten varieties, were sown on 29 September 1995 at a rate of 350 seeds per m<sup>2</sup>, on a loamy sand site at New Found Farm, Colney. The trial received normal farm inputs and was harvested on 5 August 1996. No lodging was recorded.

Brown rust (*Puccinia recondita*) levels were monitored and assessed as necessary throughout the growing season, and assessments of plant establishment, yield, grain size and specific weight were made, according to Morley standard procedures.

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\*Not for publication without the Director's consent. This report deals primarily with only one year's work, so any conclusions given are provisional.

**Rye varieties**

Hybrid		Conventional
Marder	Gambit	Halo
Calypso	Esperit	Merkator
Amando	Rapid	Sentinel
Marlo		

All seed was supplied treated with Panoctine and New Kotol.

**Results**

Variability caused by drought on light land resulted in site variation being greater than the differences between varieties. The trial received a suitable programme of fungicides but all varieties suffered a considerable infection of brown rust towards the end of the season.

**Establishment**

Emergence was observed to be even, and an overall count performed on 1 November 1995 revealed a population of 245 plants per m<sup>2</sup>.

**Disease**

Table 1. *Brown rust (%)*, whole plot assessment, 3 July 1996

Variety	
Espirit	35.5
Merkator	29.5
Marder	50.7
Halo	21.8
Rapid	32.0
Calypso	33.3
Motto	18.0
Amando	31.5
Marlo	43.5
Sentinel	36.5
LSD	9.77
SE per plot (27 df)	±6.71
CV (%)	20.2

Leaves infected with brown rust prior to 14 March 1996, when the crop was inspected, were seriously frost scorched and dying. By 9 April the crop was between late tillering and stem elongation and there was no rust detectable on live leaf tissue. When the crop was inspected on 17 May brown rust was at very low levels and confined to the lowest leaves. Mildew (*Erysiphe graminis*) was also present and although infection was at very low levels Esperit appeared more susceptible than other varieties. Fungicide treatments held diseases in check until the end of May; however by 12 June all plots were infected with brown rust and overall levels varied from 1% to 8%. High levels of rust infection were recorded on 3 July and are presented in Table 2. Marder had the highest level of brown rust infection (50.7%) significantly above all except Marlo (43.5%). Motto (18.0%) and Halo (21.8%) were least susceptible, Motto had a level of infection significantly lower than Merkator (29.5%).

### Grain yield and quality

Table 2. *Grain yield and quality*

Variety	Grain yield (t/ha at 85% dm)	Specific weight (kg/hl)	Thousand grain weight (g at 85% dm)
Esperit	5.96	75.5	34.2
Merkator	5.96	73.8	34.1
Marder	5.76	75.1	32.8
Halo	5.62	74.8	36.1
Calypso	5.63	74.6	33.1
Rapid	5.60	73.9	34.7
Motto	5.51	72.2	38.1
Amando	5.46	73.9	30.7
Marlo	5.35	72.4	36.8
Sentinel	5.32	74.7	34.2
LSD	NS	1.71	1.86
SE per plot (26 df)	±0.595	±1.18	±1.28
CV (%)	10.6	1.6	3.7

Grain yield ranged from 5.32 t/ha to 5.96 t/ha (Table 2). Esperit and Merkator shared the highest yield, and Sentinel the lowest, however this was not significant.

Specific weights were generally high, although thousand grain weights were relatively low; this being consistent with the observation that the samples were made up of typically small but well filled grains.

## Discussion

The crop established well and early season disease control was good. However disease control later in the season was not up to the normal standard allowing the rapid development of disease. The high levels of brown rust recorded in June do not appear to relate to the eventual yield results. However site variation, always a problem on very light soils, combined with drought, unfortunately meant that differences in yield were not significant. The best yield of nearly 6 t/ha is not unreasonable for the site.

## Acknowledgments

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## Appendix

The following information is presented as an appendix which is available on request.

Diary  
Field details  
Method

### Experiment diary

- 29 October 1995 Trial drilled to plan, drilling depth 30 mm in a ploughed and pressed seedbed, slightly cobbly surface with a very fine tilth beneath.
- 1 November Population counts GS 13-22
- 8 February Trial inspected for brown rust infection, low levels present on most plots, assessment not considered necessary. GS 24-26
- 14 March 1995 Trial inspected for brown rust development and frost damage, Any rust infection present is not important as leaves are very frost scorched and will die with new growth. GS 24-28
- 9 April Little if any brown rust detectable in trial, odd pustules to be found on surrounding crop, stem elongation starting with growth stage variability within plots as well as between varieties. GS 26-30
- 17 May Crop growing well and generally disease free, Esperit has relatively more mildew on its lowest leaves; Marlo, Amando, Marder and Rapid have more brown rust in their lowest leaves compared to other varieties, however the levels of disease are very low. GS 45-51
- 12 June Trial inspected, worrying levels of brown rust developing, varietal differences in brown rust obvious, all plots scored quickly for infection. GS 65-69
- 3 July Overall disease assessment performed on top four leaves for percentage of leaf area affected by brown rust. GS 75
- 5 August Trial harvested, no lodging.

**Field details**

<b>Site</b>	New Found Farm, Colney			
<b>Field reference</b>	Block 2			
<b>Crop</b>	Rye			
<b>Varieties</b>	10 (See variety list in Table 1 of the trial report)			
<b>Previous crop</b>	1995 spring barley 1994 sugar beet 1993 rye 1992 spring barley			
<b>Soil type</b>	Loamy sand (Burlingham series)			
<b>Soil analysis</b>	pH	P	K	Mg
26 January 1994	8.0	2.0	1.0	0.0
<b>Cultivations</b>	September 1995 ploughed and pressed			
<b>Drilling date</b>	29 Sept 1995			
<b>Seed treatment</b>	Panoctine (guazatine) + New Kotol (gamma-HCH)			
<b>Seedrate</b>	350 seeds/m <sup>2</sup>			
<b>Nutrients applied</b>	<b>Rate (kg/ha)</b>			
17 March	42			
22 April	<u>103</u>			
<b>Total N</b>	<u>145</u>			

## Applications to crop

Date	GS	Item (g ai/l)	Dose/ha
16 October 1995	11	Cyperkill (cypermethrin, 100)	250 ml
18 October		Avadex (tri-allate, 10% ww)	15 kg
15 November	12	Harlequin 500 SC (isoproturon, 450 + simazine, 50) + Ardent (diflufenican, 40 + trifluralin, 400)	1.5 l 1.0 l
20 March 1996	24	Chlormequat 700 (chlormequat, 700) + Mantec (elemental manganese, 310)	1.75 l 0.5 kg
15 Apr	30	Alto 100 SL (cyproconazole 100)	0.8 l
7 May	37	Terpal (2-chloroethylphosphonic acid, 155) + mepiquat chloride, 305) + non ionic wetter	1.25 l 40 ml
28 May	59	Folicur (tebuconazole 250)	1.0 l

## Method

These are an abbreviated version of the Standard Operating Procedures used at Morley Research Centre.

## Plot layout

Plots were sown at 350 seeds/m<sup>2</sup> with an Oyjord drill. The drilled plots were 12 m long and 1.56 m wide from outside row to outside row (14 rows at 12.0 cm spacing).

Common treatments such as fertiliser, insecticides, herbicides, fungicides or growth regulators were applied across all plots with farm machinery using wheelings, 24 m apart. For harvest purposes, plot length was reduced to 9.0 or 9.5 m depending on track and tyre size.

## Agronomic factors

Plant population was determined by making fifty counts of a 30.5 cm x 30.5 cm square quadrat over the trial area.

### **Foliar disease, green leaf and ear colour**

Foliar disease of a particular leaf or leaf layer(s) was determined by the following method. A standard (based on the appropriate key from the ADAS manual of disease assessment keys, 1976) was agreed between two experienced assessors and plots were assessed by walking along the gap between the harvest area and the buffer, examining the plot from both sides. The crop was examined at intervals and an appropriate disease level was agreed at the end of each plot.

### **Harvest details**

Plots were harvested using a Claas compact 25 combine which was modified for plot work and used electronic weighing (Novatech M864 Loadmeter). Trials were harvested by replicate.

### **Post harvest determinations**

Moisture content was determined using a Burrows digital moisture computer. A minimum of two samples were tested from each plot, with a tolerance of 0.2% required between samples.

The grain samples were pre cleaned using a Rational sample cleaner to remove any chaff or straw before further assessments (specific weight or 1000 grain weight) were carried out.

Specific weight was determined using a Farm-Tec Easi-Lab chondrometer and electronic balance. A minimum of two samples were tested from each plot, with a tolerance of 2.0 g required between samples.

1000 grain weight was determined by counting 200 grains from a well mixed sample and weighing on an electronic balance. A minimum of two samples were counted from each plot with a tolerance of 0.2 g required between samples.